UNITED STATES PATENT AND TRADEMARK OFFICE

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10/787,373	02/25/2004	Terence Edwin Dodgson	678-1388	4425

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EXAMINER
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ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _(3)_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _11 March 2008_.
2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-4 and 6-10_ is/are pending in the application.
   4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) _1-4 and 6-10_ is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a)☐ All   b)☐ Some * c)☐ None of:
      1.☐ Certified copies of the priority documents have been received.
      2.☐ Certified copies of the priority documents have been received in Application No. _____.
      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
      Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
      Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Examiner's Detailed Office Action

1. This Office Action is responsive to the communication for application 10/787,373, filed

March 11, 2008.

2. Claims 1-4 and 6-10 are pending. Claims 1, 3, and 4 are currently amended. Claim 5 is

cancelled. Claims 2 and 6-10 are previously presented.

3. After the previous office action, claims 1-4 and 6-10 stood rejected.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or
> any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and
> requirements of this title.

5. Claims 1-4 and 6-10 are rejected under 35 U.S.C. 101 because the claimed invention is

directed to non-statutory subject matter: algorithm and signal.

Amended independent claim 1 recites a "method of training a neural network to perform

decoding of a time-varying signal comprising a sequence of input symbols..." where the final

result is "the input symbol is transmitted together with the plurality of output symbols to the

decoder." Applicants define a decoder as a "Viterbi decoder" (see Specification, p. 3, line 1).

Examiner considers a Viterbi decoder to be no more than an algorithm (see

http://en.wikipedia.org/wiki/Iterative_Viterbi_decoding) and the neural network as defined in the

Specification, §Structure of Known Neural Networks, pp. 6-8 to be a mathematical model.

Further, the final result is considered to recite only output symbols produced by a transformation

of input symbols. Thus amended independent claim 1 is considered to recite a process that is not

tied to another statutory class (such as a machine or manufacture) and does not transform

underlying subject matter (such as an article or material) to a different state or thing. Therefore,

claim 1 is considered to be non-statutory under 35 U.S.C. 101 (see Court of Appleas for the

Federal Circuit in *In re Biliski*, Appeal No. 2007-1130). Dependent claim 2 recites only details

about the relationship of the input symbols to the output symbols and is not considered to cure

the defect of claim 1. Therefore claims 1 and 2 are considered to be non-statutory under 35

U.S.C. 101.

Amended independent claim 3 recites a "method of encoded communications in which input

symbols are convolutionally encoded to provide, for each input symbol, a plurality of output

symbols which depend on the input symbol, and the input symbol is transmitted together with the

plurality of output symbols to a communications network for decoding encoded communications

in which received input symbols are convolutionally encoded to provide, for each received input

symbol, a plurality of output symbols which depend on the input symbol, connected so as to feed

back to inputs of the network at least some of the decoded symbols the network generates at its

outputs, wherein at least one of the decoded symbols corresponding to the input symbol and the

plurality of output symbols is output from the network, and at least one of the input symbols is

transmitted to the network together with the coded output symbols, and fed to the inputs of the

network together with the fed-back decoded symbols." Claim 3 is considered non-statutory

under 35 U.S.C. 101 because the method is tied to the non-statutory subject matter of signal

where "the input symbol is transmitted together with the plurality of output symbols to a

communications network" and "and at least one of the input symbols is transmitted to the

network together with the coded output symbols". Therefore, claim 3 is considered to be non-

statutory under 35 U.S.C. 101.

Amended independent claim 4 recites a "neural network" to essentially perform the decoding

method of claim 3. Claim 4 is considered non-statutory under 35 U.S.C. 101 because the method

is tied to the non-statutory subject matter of signal where "the input symbol is transmitted

together with the plurality of output symbols to a communications network". Claims 6-10

(particularly, claim 10) do not cure the defect of claim 4, therefore, claims 4 and 6-10 are

considered to be non-statutory under 35 U.S.C. 101.

Response to Arguments

6. Applicant's arguments filed March 11, 2008 have been fully considered but they are not

persuasive.

<u>Rejection of Claims 1-4 and 6-10 Under 35 U.S.C. §101</u>

Applicants argue:

  The Examiner rejected Claims 1-4 and 6-10 under 35 U.S.C. § 101 as being directed toward non-statutory subject matter in the form of an algorithm and a signal.

  Claim 1 recites a method of training a neural network to perform decoding of a time- varying signal comprising a sequence of input symbols, which is coded by a convolutional coder such that each coded output symbol depends on more than one input symbol. A plurality of successive input symbols are provided to the neural network and to the convolutional coder. The network outputs are compared with the input signals. Parameters of the network are adapted to reduce differences there between. The input symbol is transmitted together with the plurality of output symbols to a communications network decoder.

  Claim 1 has been amended to more clearly recite statutory subject matter. More specifically, Claim 1 has been amended to recite that the providing, comparing and adapting steps are repeated until the differences are reduced below a threshold and the neural network substantially operates as a decoder of the convolutional encoder.

Examiner responds:

Amended independent claim 1 recites a "method of training a neural network to perform

decoding of a time-varying signal comprising a sequence of input symbols..." where the

final result is "the input symbol is transmitted together with the plurality of output

symbols to the decoder." Examiner considers a Viterbi decoder to be no more than an

algorithm (see http://en.wikipedia.org/wiki/Iterative_Viterbi_decoding) and the neural

network as defined in the Specification, §Structure of Known Neural Networks, pp. 6-8

to be a mathematical model. Further, the final result is considered to recite only output

symbols produced by a transformation of input symbols. Thus amended independent

claim 1 is considered to recite a process that is *not* tied to another statutory class (such as

a machine or manufacture) and does *not* transform underlying subject matter (such as an

article or material) to a different state or thing. Therefore, claim 1 is considered to be

non-statutory under 35 U.S.C. 101 (see Court of Appleas for the Federal Circuit in *In re*

Biliski, Appeal No. 2007-1130). Dependent claim 2 recites only details about the

relationship of the input symbols to the output symbols and is not considered to cure the

defect of claim 1. Therefore claims 1 and 2 are considered to be non-statutory under 35

U.S.C. 101.

Applicants argue:

> The Examiner also rejected independent Claims 3 and 4 under 35 U.S.C. §101.
> Claims 3 and 4 have been amended to recite that at least one of the decoded symbols
> corresponding to the input symbol and the plurality of output symbols is output from the
> network.

Examiner responds:

Amended independent claim 3 recites a "method of encoded communications in which input

symbols are convolutionally encoded ..." Claim 3 is considered non-statutory under 35 U.S.C.

101 because the method is tied to the non-statutory subject matter of signal where "the input

symbol is transmitted together with the plurality of output symbols to a communications

network" and "and at least one of the input symbols is transmitted to the network together with

the coded output symbols". Therefore, claim 3 is considered to be non-statutory under 35 U.S.C.

101.

Amended independent claim 4 recites a "neural network" to perform the decoding method of

claim 3. Claim 4 is considered non-statutory under 35 U.S.C. 101 because the method is tied to

the non-statutory subject matter of signal where "the input symbol is transmitted…to a

communications network". Claims 6-10 do not cure the defect of claim 4, therefore, claims 4

and 6-10 are considered to be non-statutory under 35 U.S.C. 101.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as

set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing

date of this final action.

Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner

should be directed to Nathan H. Brown, Jr. whose telephone number is 571-272- 8632. The

examiner can normally be reached on M-F 0830-1700. If attempts to reach the examiner by

telephone are unsuccessful, the examiner's supervisor, David Vincent can be reached on 571-

272-3080. The fax phone number for the organization where this application or proceeding is

assigned is 703-872-9306. Information regarding the status of an application may be obtained

from the Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR. Status

information for unpublished applications is available through Private PAIR only. For more

information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions

on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-

9197 (toll-free).

/Nathan H. Brown, Jr./
June 3, 2008

/David R Vincent/

Supervisory Patent Examiner, Art Unit 2129